

MINOR PLANET No. 262.—This object has received the name of Valda.

HARVARD COLLEGE OBSERVATORY.—The late Uriah A. Boyden having left property to the value of 230,000 dollars in trust for the purpose of astronomical research, the Trustees of the fund have transferred the property to the President and Fellows of Harvard College, in order that the researches proposed by Mr. Boyden may be directed at the Harvard College Observatory. These researches will be supported by a portion of the means of the Observatory, in addition to the trust fund itself. By the terms of the will the money is to be devoted to observations "at such an elevation as to be free, so far as practicable, from the impediments to accurate observations which occur in the observatories now existing, owing to atmospheric influences."

ASTRONOMICAL PHENOMENA FOR THE WEEK 1887 MARCH 27—APRIL 2

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on March 27

Sun rises, 5h. 49m.; souths, 12h. 5m. 30^s.; sets, 18h. 22m.; decl. on meridian, 2° 35' N.; Sidereal Time at Sunset, 6h. 41m.

Moon (at First Quarter on April 1) rises, 7h. 19m.; souths, 14h. 12m.; sets, 21h. 16m.; decl. on meridian, 9° 44' N.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian
Mercury ...	5 19 ...	11 26 ...	17 33 ...	0° 40' N.
Venus ...	6 38 ...	13 47 ...	20 56 ...	12 41' N.
Mars ...	6 3 ...	12 30 ...	18 57 ...	4 37' N.
Jupiter ...	20 47* ...	1 52 ...	6 57 ...	11 28' S.
Saturn ...	10 39 ...	18 48 ...	2 57* ...	22 30' N.

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Occultations of Stars by the Moon (visible at Greenwich)

March	Star	Mag.	Disap.	Reap.	Corresponding angles from ver- tex to right for inverted image
27 ...	μ Ceti ...	4 ...	18 42 ...	19 35 ...	108° 359'
29 ...	71 Tauri ...	6 ...	20 38 ...	near approach	47 —
29 ...	θ ¹ Tauri ...	4½ ...	21 17 ...	22 13 ...	117° 335'
29 ...	θ ² Tauri ...	4½ ...	21 26 ...	22 8 ...	91° 0'
29 ...	75 Tauri ...	6 ...	21 46 ...	near approach	226 —
29 ...	B.A.C. 1391 ...	5 ...	22 16 ...	23 7 ...	159° 288'
29 ...	85 Tauri ...	6 ...	23 12 ...	near approach	42 —
31 ...	115 Tauri ...	6 ...	0 9 ...	0 45 ...	173° 258'

April
2 ... B.A.C. 2731 ... 6½ ... 21 20 ... 22 30 ... 111° 288'

March
27 ... 0 ... Venus in conjunction with and 4° 50' north of the Moon.

April
1 ... 22 ... Saturn in conjunction with and 3° 23' north of the Moon.

Variable Stars

Star	R.A. h. m.	Decl. h. m.
Algol ...	3 0'8 ... 40 31' N.	Mar. 28, 19 3 m
ζ Geminorū ...	6 57'4 ... 20 44' N.	„ 30, 22 0 m
δ Libræ ...	14 54'9 ... 8 4' S.	„ 30, 22 21 m
U Coronæ ...	15 13'6 ... 32 4' N.	„ 30, 22 43 m
U Herculis ...	16 20'8 ... 19 9' N.	Apr. 1, m
U Ophiuchi ...	17 10'8 ... 1 20' N.	Mar. 28, 4 58 m
	and at intervals of 20 8	
W Sagittarii ...	17 57'8 ... 29 35' S.	Mar. 29, 3 0 M
R Lyræ ...	18 51'9 ... 43 48' N.	„ 31, m
η Aquilæ ...	19 46'7 ... 0 43' N.	Apr. 2, 2 0 M
S Sagittæ ...	19 50'9 ... 16 20' N.	„ 2, 4 0 M
T Aquarii ...	20 44'0 ... 5 34' S.	Mar. 28, m
T Cephei ...	21 8'1 ... 68 2' N.	„ 31, M
δ Cephei ...	22 25'0 ... 57 50' N.	„ 28, 2 0 m

M signifies maximum; m minimum.

GEOGRAPHICAL NOTES

IN a recently-issued Colonial Office Report on the Gambia will be found some useful data on the climate of that colony which completely upset the results of previous observations and greatly reduce the temperatures hitherto accepted. The mean temperature, according to these latest observations, varies from 68°·5 in January to 80° in July at 7 a.m., and from 73°·7 in January to 82°·5 in July at noon. The same Report contains some interesting statements relating to the ethnology of the colony.

THE principal paper in the just-issued Bulletin (only No. 4 of 1885) of the American Geographical Society is on the historical and geographical features of the Rocky Mountain Railways, by Mr. James Douglass. There is also a translation of Baron Nordenskjöld's reply to criticisms on the "Voyage of the Vega." The criticisms relate to points of minor importance.

THE new number of the "Antananarivo Annual and Madagascar Magazine" (Christmas, 1886), consists, besides a reprint of Mr. A. R. Wallace's chapter on the fauna of Madagascar, mainly of papers on linguistic topics and on Malagasy folk-lore. M. Grandidier's paper on the channels and lagoons of the east coast of the island is translated with some interesting remarks by Mr. Sibree appended. Mr. Sibree points out that it would only require about thirty miles of canals to connect all these lagoons and so create a safe and extensive internal waterway of the greatest commercial value. The Rev. W. Montgomery contributes a paper on the Malagasy game of "Fananana," in many respects resembling chess.

IN the new number (Heft i. Band 10.) of the *Deutsche Geographische Blätter*, we find a useful and careful, if rather too favourable, study of the trade-routes of Mexico, old and new, and their commercial importance, by Herr A. Scobel. From a scientific point of view the most valuable paper is that of Dr. Otto Finsch on his visit three years ago to the atoll of Diego Garcia in the Chagos Archipelago, about half-way between the Seychelles and Ceylon. Dr. Finsch was only a few hours on the islands, but his notes on the people (mostly of the Negro type from the Mauritius) and the richness of the bird life are interesting. An open space in the little east island was covered with "millions" of birds, whose combined cry was deafening. Eggs, also in "millions," lay about everywhere, unprotected by any nest. The commonest among these birds was the sooty tern (*Sterna fuliginosa*). Next to the Laccadives, the Chagos Islands seem to be the favourite breeding-place of this bird in the Indian Ocean. The variety in the colouring of the eggs was unprecedented in Dr. Finsch's experience, especially considering the fact that they all belonged to birds of the one species named above. The only other species noticed in the island by Dr. Finsch was the noddy (*Anous stolidus*). The birds arrive in the islands in the month of June, and stay till the young are fledged; by November they have all taken their departure. As on most coral islands, the animal world generally is very poor.

THE same number contains an account of Fontana's exploration of Eastern Patagonia in 1885, and also a short biography of Emin Pasha. From the latter we learn that Edward Schnitzer was born at Oppeln, in Silesia, in 1840; received his early education at Neisse, in Upper Silesia, and studied medicine at Breslau, Berlin, and Königsberg. From his earliest years he had a special taste for natural history, and especially ornithology, and in the latter department he has all along been a diligent collector. In 1864 we find Schnitzer at Antivari, in Albania, as a surgeon in the Turkish service. In 1870 he accompanied Ismail Pasha to Syria and Arabia, and afterwards to Trebizond, Erzerum, and Epirus. At Ismail's death in 1874, Schnitzer came to Constantinople, and in 1875 made a short visit to his German home. Entering the Egyptian service, he, in 1876, followed Gordon Pasha from Cairo into the Soudan, where, under the title of Emin Effendi, he was appointed chief surgeon, and in 1878 Governor-General of the Equatorial Province, with the title of Bey. His work as administrator, scientific explorer, and collector, since then is well known. To Bremen and Vienna he has sent some 2000 bird-skins, carefully labelled with all necessary information, and including some twenty-five new species.

SINCE the time of Herodotus travellers in Africa have brought home reports of pygmy tribes scattered about in various regions of Africa. Readers of Schweinfurth will remember the Akkas

whom he met in the Monbuttu country, and now Dr. Ludwig Wolf, who, with Wissmann, recently explored the Sankuru, the great southern tributary of the Congo, gives us many details of a similar pygmy race among whom he sojourned for some time, in the district to the north-west of the station Luluaburg. He found entire villages inhabited by tiny men and women, of a height of not more than 1'40 metre. Among their neighbours they are known as Batua. These are nomad tribes devoting themselves exclusively to the chase and the manufacture of palm wine. Their villages, consisting of huts, are met with in clearings in the forests which cover the greater part of the country. Each district thus possesses a village of pygmies. As is the case of the Akkas among the Monbuttus, so the Batua among the Bakubu are regarded as little benevolent beings whose special mission is to provide the tribes among whom they sojourn with game and palm-wine. In exchange, manioc, maize, and bananas are given to the pygmies. Generally they live apart, but sometimes they unite themselves with races of larger stature. They excel in the art of scaling palm-trees to collect the sap, and in setting traps for game. Their agility is almost incredible. In hunting they bound through the high grass like grasshoppers, facing the elephant, antelope, and buffalo with the greatest audacity, shooting their arrows with rare precision, following up rapidly with a stroke of the lance. Physically the Batua are very well made, having absolutely no deformity. They are simply little men, well proportioned, very brave, and very cunning. Their mean height is 1'30 metre. Their skin is a yellow-brown, less dark than that of larger races. Their hair is short and woolly. Neither the Akkas nor the Batua have any beard.

SUNLIGHT COLOURS¹

SUNLIGHT is so intimately woven up with our physical enjoyment of life that it is perhaps not the most uninteresting subject that can be chosen for what is—perhaps somewhat pedantically—termed a Friday evening “discourse.” Now, no discourse ought to be possible without a text on which to hang one's words, and I think I found a suitable one when walking with an artist friend from South Kensington Museum the other day. The sun appeared like a red disk through one of those fogs which the east wind had brought, and I happened to point it out to him. He looked, and said, “Why is it that the sun appears so red?” Being near the railway station, whither he was bound, I had no time to enter into the subject, but said if he would come to the Royal Institution this evening I would endeavour to explain the matter. I am going to redeem that promise, and to devote at all events a portion of the time allotted to me in answering the question why the sun appears red in a fog. I must first of all appeal to what everyone who frequents this theatre is so accustomed, viz. the spectrum; I am going not to put it in the large and splendid stripe of the most gorgeous colours before you with which you are so well acquainted, but my spectrum will take a more modest form of purer colours some twelve inches in length.

I would ask you to notice which colour is most luminous. I think that no one will dispute that in the yellow we have the most intense luminosity, and that it fades gradually in the red on the one side and in the violet on the other. This then may be called a qualitative estimate of relative brightnesses; but I wish now to introduce to you what was novel last year, a quantitative method of measuring the brightness of any part.

Before doing this I must show you the diagram of the apparatus which I shall employ in some of my experiments.

RR are rays (Fig. 1) coming from the arc light, or, if we were using sunlight, from a heliostat, and a solar image is formed by a lens, L_1 , on the slit s_1 of the collimator C. The parallel rays produced by the lens L_2 are partially refracted and partially reflected. The former pass through the prisms P_1P_2 , and are focused to form a spectrum by a lens, L_3 , on D, a movable ground glass screen. The rays are collected by a lens, L_4 , tilted at an angle as shown, to form a white image of the near surface of the second prism on F.

Passing a card with a narrow slit, s_2 , cut in it in front of the spectrum, any colour which I may require can be isolated. The consequence is that, instead of the white patch upon the screen, I have a coloured patch, the colour of which I can alter to

any hue lying between the red and the violet. Thus, then, we are able to get a real patch of very approximately homogeneous light to work with, and it is with these patches of colour that I shall have to deal. Is there any way of measuring the brightness of these patches? was a question asked by General Festing and myself. After trying various plans, we hit upon the method I shall now show you, and if anyone works with it he must become fascinated with it on account of its almost childish simplicity—a simplicity, I may remark, which it took us some months to find out. Placing a rod before the screen, it casts a black shadow surrounded with a coloured background. Now I may cast another shadow from a candle or an incandescence lamp, and the two shadows are illuminated, one by the light of the coloured patch and the other by the light from an incandescence lamp which I am using to-night. [Shown.] Now one stripe is evidently too dark. By an arrangement which I have of altering the resistance interposed between the battery and the lamp, I can diminish or increase the light from the lamp, first making the shadow it illuminates too light and then too dark compared with the other shadow which is illuminated by the coloured light. Evidently there is some position in which the shadows are equally

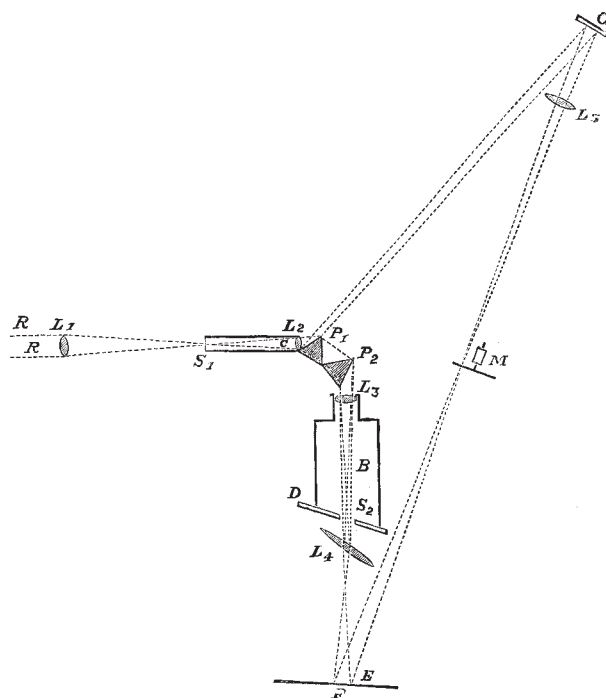


FIG. 1.—Colour Photometer.

luminous. When that point is reached, I can read off the current which is passing through the lamp, and having previously standardised it for each increment of current, I know what amount of light is given out. This value of the incandescence lamp I can use as an ordinate to a curve, the scale number which marks the position of the colour in the spectrum being the abscissa. This can be done for each part of the spectrum, and so a complete curve can be constructed which we call the illumination curve of the spectrum of the light under consideration.

Now, when we are working in the laboratory with a steady light, we may be at ease with this method, but when we come to working with light such as the sun, in which there may be constant variation owing to passing, and maybe usually imperceptible, mist, we are met with a difficulty; and in order to avoid this, General Festing and myself substituted another method, which I will now show you. We made the comparison light part of the light we were measuring. Light which enters the collimating lens partly passes through the prisms and is partly reflected from the first surface of the prism; that we utilise, thus giving a second shadow. The reflected

¹ Lecture delivered by Capt. W. de W. Abney, R.E., F.R.S., at the Royal Institution, on February 25, 1887.